REMARKS

In the Office Action of December 20, 2001, the finality of the earlier Office Action and the rejection of certain claims under a defective reissue declaration were withdrawn. Such withdrawal is noted and appreciated.

In the Office Action of December 20, 2001, the Examiner requested applicant to provide a copy of all pending claims in the application to ease the examination process. Accordingly, attached to this Response To Office Action as a separate document is a document entitled "Pending Application Claims As Of Office Action Dated December 20, 2001". This includes claims 1-5, 7-15, 17-22, 31-43 and 47-53.

Claims 50-52 have been rejected under § 112 as containing new matter not supported by the original disclosure. To overcome this rejection, the terminology "said at least one other layer" has been deleted and the other language rearranged to be consistent with the original disclosure. It is submitted that with this change, the rejection of independent claim 50 and dependent claims 51 and 52 under § 112 has been overcome.

Claims 33-34 and 40-42 have also been rejected under § 112 as containing new matter. Applicants do not agree with this conclusion for the reasons stated previously in other responses. Nevertheless, without prejudice to applicants' right to reassert such claims in this or a related application, independent claims 33 and 40, and thus respective dependent claims 34 and 41,42, have been amended to overcome the alleged new matter rejection by including "tin-doped indium oxide" as part of the other of the second and fourth layers. With this change, both the second and the fourth layers recite the same compositions and it is submitted that the § 112 rejections of independent claims 33 and 40 and their respective dependent claims 34 and 41, 42 have been overcome.

Claims 1-5, 7-15, 17-22, 31-43 and 47-53 have been rejected under § 112 as being indefinite as containing the term "substantially". Pursuant to the above amendments, the term "substantially" has been deleted from the affected claims. Accordingly, this rejection under § 112 of the above claims has been overcome.

Claims 1-5, 7-8, 11-15, 17, 18, 33-35, 38-40, 43 and 48-52 have been rejected under § 103 as being unpatentable over the Okaniwa Patent No. 5,667,880 in view of the Dickey Patent No. 5,372,874 and claims 47 and 53 have been rejected under § 103 as unpatentable over Dickey. These references have again been carefully reviewed and along with the additional prior art which has been cited in the prosecution of corresponding foreign applications and the claims presently in the application have been amended to more specifically define the present invention and to distinguish those claims from such prior art. Accordingly, reconsideration of the patentability of the present invention is respectfully requested in view of the amendments to the claims, the discussion of the teachings of the prior art references and the following comments.

The Present Invention

The present invention relates to a sputter coated, anti-reflective coating for a "temperature sensitive" or plastic substrate and a method for producing the same. In other words, the invention involves an anti-reflective (AR) coating applied to a "plastic" rather than a "glass" substrate. Commonly, high index materials such as titanium dioxide (TiO_2) and certain others are used to form AR coatings because of the high quality and high performance coatings that they form. TiO_2 and the various other commonly used high index materials which are applied by sputtering need to be sputtered at a relatively high temperature and at slower rates and thus over a longer period of time. This is not a problem which the substrate is glass because glass has a relatively high melting point. However, it is a problem with plastic substrates with lower melting points because the plastic will tend to melt when high temperature materials such as TiO_2 are applied. Accordingly, the present invention has discovered a group of materials that can be sputtered quickly and at relatively low temperatures, while still providing the needed high refractive index and other desired characteristics of such materials and thus the resulting AR coating. Further, the present invention has combined those materials with other low refractive index materials in specific positions relative to the substrate on which they are coated and has

identified specific optical thicknesses or optical thickness ranges of such materials. The resulting coating provided by this combination is novel and unobvious and exhibits optical characteristics as good as or better than those of the prior art.

Amendments to the Claims

In addition to the amendments discussed above which have been made to the claims to overcome the § 112 rejections, each of the claims requires or has been amended to require the anti-reflection coating or method for producing the same to include at least one high refractive index layer with a refractive index higher than the substrate which is selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-zinc oxide and in which such high refractive layer has an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers. In claims where a plurality of high refractive index layers are recited, the high refractive index layer which is farthest from the substrate is required to have an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers. This is a limitation which distinguishes the present claims from all of the prior art references considered including the Okaniwa '888 and Dickey '874 patents relied on by the Examiner, all of the newly disclosed art in the accompanying Information Disclosure Statement and the Rock U.S. Patent No. 3,432,225 disclosing the Rock system disclosed and referred to in the background section of the present application. An anti-reflection coating or a method for producing the same having such high refractive material layer with this optical thickness range in accordance with the present invention results in a significantly superior coating both with respect to reflectivity (i.e., reducing reflection) or luminosity as well as providing a desired hue to the minimal light that is reflected.

The Prior Art

Countless patents exist with respect to coatings in general, more specifically to sputtered coatings and still more specifically to anti-reflective sputtered coatings. One reason for the numerous patents and coatings is the number of variables affecting the optical performance of such coatings including the anti-reflective qualities of the coating and the color hue of the light that is reflected. These variables include, among possible others, the type and nature of the

substrate itself, the number of layers of the coating, the optical and/or physical thicknesses of each of those layers individually as well as relative to one another, the specific materials making up those layers, both individually as well as relative to one another and the refractive indices of each of the materials making up the layers, both individually as well as in relationship to one another. It is easy to look at the prior art and conclude, because the structure seems to look somewhat similar to the claimed structure and seems to have some of the same components that the prior art discloses the claimed subject matter or subject matter which would have been obvious to modify. However, this is not the case. Substituting one material for another, even with comparable refractive indices or changing the optical or physical thickness of an individual layer or the position of the layer within a stack can change the optical characteristics of the resulting coating significantly and does not necessarily lead to a predictable optical structure.

The "optical thickness" of a layer in an optical coating is calculated by multiplying the physical thickness of that layer by the refractive index of that layer and dividing the result by the reference or design wavelength. Anti-reflective coatings in the prior art which have utilized alternating layers of high and low refractive index materials have typically required the high refractive index material layer farthest from the substrate to have an optical thickness of about one-half wavelength and about twice the optical thickness of the outermost layer which is commonly a low refractive index material layer. The refractive index of the materials in an anti-reflective coating as well as the optical thicknesses of those material layers are commonly determined at a design wavelength somewhere around the middle of the visible spectrum, i.e. from about 480 to 560 nanometers. For example, the refractive indices and the optical thicknesses of the materials in Tables 2, 4 and 5 of the present application are determined at a design or reference wavelength of 550 nanometers, while the refractive indices and the optical thicknesses of the materials in Table 3 of the present application are determined at a design or reference wavelength of 510 nanometers.

Similarly, the refractive indices and the optical thicknesses of the coating layers identified in Table 1 of the present application (which reflects a known prior art coating) is determined at a design or reference wavelength of 550 nanometers. As can be seen, the optical thickness of the high refractive index material farthest from the substrate (Layer No. 2) in Table 1 is 0.459 (or about one-half) wavelength and is about twice the optical thickness of the

outermost low refractive index material layer (0.239). The fact that these optical thicknesses are a bit below the desired optical thicknesses of one-half and one-quarter wavelength, respectively, of the prior art structure of Table 1 is to be expected because the refractive index and optical thickness determinations of Table 1 are made at a design wavelength of 550 nanometers which is near the high end of the middle portion of the visible wavelength spectrum. If these determinations were made at a reference wavelength closer to the center of the visible light spectrum, these values would be extremely close to the desired nominal values of one-half and one-quarter wavelength.

In contrast, it can be seen that each of the optical thicknesses of the high refractive index layer farthest from the substrate in each of Tables 2-5 of the present application is in the range of one-quarter to one-third wavelength, while the optical thickness of the outermost low refractive index material layer is about one-quarter wavelength.

The well-known Rock system, of which the present invention is a modification, includes four layers in which the first or outermost layer of a low refractive index has an optical thickness of about one-quarter wavelength and the second or high refractive index layer has an optical thickness of about one-half to six tenths of a wavelength. (See the base Patent No. 5,579,162 of which this is a reissue at column 2, lines 56-63.) This is confirmed by the Rock Patent No. 3,432,225 disclosed in the accompanying Information Disclosure Statement. (See reference numeral 18 of Figures 1 and 4 and the disclosure in column 4, lines 19-24.)

Similarly, each of the various embodiments disclosed in Okaniwa Patent No. 5,667,880 relied on by the Examiner in the present rejection discloses optical thicknesses of the high refractive index material layer farthest from the substrate of about one-half wavelength (similar to the Rock system and other known AR coatings discussed above) or at a value significantly lower than the one-quarter to one-third wavelength recited in the present claims. Specifically, the optical thicknesses for the nine embodiments (represented by Tables 1-9) of the Okaniwa

'880 patent are as follows:

Table No.	Layer No.	Material	Optical Thickness
Table 1	Third	TiO_2	0.49
Table 2	Fourth	TiO_2	0.50
Table 3	Fifth	TiO_2	0.13
Table 4	Sixth	TiO_2	0.11
Table 5	Seventh	TiO_2	0.13
Table 6	Fourth	TiO_2	5.01
Table 7	Fourth	ITO	0.03
Table 8	Sixth	ITO	0.03
Table 9	Seventh	ITO	0.03

Thus, it can be seen that the coatings disclosed in Okaniwa have optical thicknesses for the outermost high refractive index material layer significantly different from that defined in the present claims. None is in, or even close to, the one-quarter to one-third wavelength limitation of the amended claims. Specifically, in Tables 1 and 2, the optical thickness of this layer is about one-half wavelength which is consistent with the Rock system and other known anti-reflective coatings. The optical thickness of this layer in Tables 3, 4, 5 and 7, 8 and 9, however, is significantly lower (on the order of 0.03 to 0.13) than the one-quarter to one-third wavelength requirement of the present claims. Table 6 discloses an optical thickness for this layer of 5.01.

The Dickey '874 patent upon which the Examiner relies discloses a sputtered coating structure incorporating at least one sputtered niobium oxide (Nb_2O_5) layer. The structure of Figure 1 is described as being in the form of a Rock-type anti-reflection coating in which the outermost layer (a low refractive index material) has an optical thickness of about one-quarter wavelength at a wavelength of about 510 nm, with the second layer (the outermost high refractive index material layer) having an optical thickness about twice that, namely, about one-half wavelength. The embodiment of Figure 4 of Dickey is a multi-layer enhanced "reflector" coating which essentially is a mirror and the opposite to an anti-reflection coating.

Thus, it does not meet the threshold requirement of an "anti-reflection" coating as required by all of the claims. In any event, this structure of Figure 4 is entirely different than that of the claim structure in that the stack is essentially reversed, with the high refractive index materials 30 and 34 forming the outermost surface of the coating.

The newly disclosed prior art, some of which was cited in the corresponding Japanese application, discloses a similar structure. For example , Japanese Publication No. 61-168899 discloses coatings (in both Tables 1 and 2) in which the outermost high refractive index material layer of ITO has an optical thickness of about one-half wavelength (0.51620 in Table 1 and 0.48420 in Table 2).

The four layer anti-reflection coating of Sumita Patent No. 3,781,090 also discloses the outermost high refractive index layer 22 as having an optical thickness of about one-half wavelength (see Tables 1-15) and discloses a workable range of optical thicknesses of such layer of being greater than 0.40 and less than 0.52.

In summary, the anti-reflective coatings in accordance with the present invention differ from the coatings of the cited references and other prior art in that the present invention requires the outermost high refractive index layer, or the high refractive index layer farthest from the substrate, to have an optical thickness within the range of about one-quarter to one-third wavelength. In contrast, the prior art discloses the optical thickness of such layer to be about one-half wavelength (which is conventional) or significantly less (on the order of 0.13 wavelength or less).

There are no teachings in any of the references that would suggest modifying these optical thicknesses to the range now present in the claims of the present invention. Further, there is no motivation to do so. In fact, such a modification would be inconsistent with the teachings of those references.

Accordingly, for all of the above reasons, and particularly in view of the amendments to the claims, the discussion of the prior art references and the differences between the claims and such references, it is believed that all of the claims currently in the application are now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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Marked-Up Version Showing Changes

IN THE CLAIMS

Amend claims 1, 8-10, 17, 33, 36-40, 43, 49 and 50 as follows:

1. (Amended) A coated article comprising:

a temperature-sensitive substrate having a melting point lower than glass;

an anti-reflection coating including a plurality of layers [substantially] transparent to visible light, at least two of said layers being a reactively sputtered high refractive index material layer having a refractive index higher than said substrate and between approximately 1.9 and 2.2 and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide, and tin-zinc oxide, and at least one other layer being a low refractive index material layer having a refractive index lower than said substrate, wherein said high refractive index material layer farthest from said substrate having an optical thickness of about one-quarter to one-third wavelength at a wavelength between 480 and 560 nanometers.

8. (Amended) A process for making a coated article, comprising the steps of:

providing a temperature-sensitive substrate having a melting point lower than glass and a surface for receiving an anti-reflection coating;

depositing an anti-reflection coating including a plurality of layers [substantially] transparent to visible light on said surface, said depositing step including the steps of [reactively] sputtering at least two layers of high refractive index material selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide, and tin-zinc oxide, and having an index of refraction between approximately 1.9 and 2.2 wherein the layer of high refractive index material farthest from the substrate has an

optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers; and

depositing at least one layer of a low refractive index material having a refractive index lower than said high refractive index material wherein one of said low refractive index material layers is deposited between said high refractive index material layers.

9. (Amended) An anti-reflection coating for a substrate comprising:

four layers substantially transparent to visible light and designated the first, second, third, and fourth layers in consecutive numerical order beginning with the layer farthest from the substrate;

said first layer composed of silicon dioxide having a refractive index lower than said substrate, and optical thickness of about one-quarter wavelength at a wavelength between 480 and 560 nanometers, and a physical thickness of about 94.2 nanometers;

said second layer composed of tin oxide having a refractive index higher than said substrate, an optical thickness between about one-quarter and one third of a wavelength at a wavelength between 480 and 560 nanometers, and a physical thickness of about 76.4 nanometers;

said third layer [substantially] composed of silicon dioxide having a refractive index lower than said second layer and a physical thickness of about 31.9 nanometers;

said fourth layer [substantially] composed of tin oxide having a refractive index greater than said third layer and a physical thickness of about 20.3 nanometers; and

said third and fourth layers having a total optical thickness less than one-quarter wavelength at a wavelength between 480 and 560 nanometers.

10. (Amended) An anti-reflection coating, for a substrate, comprising:

four layers [substantially] transparent to visible light and designated the first, second, third, and fourth layers in consecutive numerical order beginning with the layer farthest from the substrate;

said first layer [substantially] composed of silicon dioxide having a refractive index lower than said substrate, an optical thickness of about one-quarter wavelength at a wavelength between 480 and 560 nanometers, and a physical thickness of about 92.2 nanometers;

said second layer [substantially] composed of tin oxide having a refractive index higher than said substrate, an optical thickness between one-quarter and one third of a wavelength at a wavelength between 480 and 560 nanometers, and a physical thickness of about 78.1 nanometers;

said third layer [substantially] composed of silicon dioxide having a refractive index lower than said second layer and a physical thickness of about 32.2 nanometers;

said fourth layer [substantially] composed of tin oxide having a refractive index greater than said third layer and a physical thickness of about 18.6 nanometers; and

said third and fourth layers having a total optical thickness less than one-quarter wavelength at a wavelength between 480 and 560 nanometers.

17. (Amended) The article of claim 11 wherein said plurality of layers includes four layers designated the first, second, third and fourth layers in consecutive numerical order beginning with the layer farthest from the substrate,

said first layer [substantially] composed of silicon dioxide with a refractive index lower than said substrate and having an optical thickness of about one-quarter wavelength at a wavelength between 480 and 560 nanometers,

said second layer having a refractive index higher than said substrate and between approximately 1.9 and 2.2 and having an optical thickness between about one-quarter and one-third of a wavelength at a wavelength between 480 and 560 nanometers and comprising one of said two layers,

said third layer having a refractive index lower than said second layer and comprising said one other layer,

said fourth layer having a refractive index greater than said third layer and comprising the other of said two layers, said third and fourth layers having a total optical thickness less than one-quarter wavelength at a wavelength between 480 and 560 nanometers, and said second and fourth layers being said selected sputtered material.

33. (Amended) An article comprising:

(a) a temperature-sensitive substrate having a melting point lower than glass; and

(b) an anti-reflective coating comprising a plurality of layers [substantially] transparent to visible light beginning with the first layer being farthest from said substrate, wherein:

(1) a first layer and a third layer are composed of silicon dioxide; and

(2) a second layer and a fourth layer have refractive indices between approximately 1.9 and 2.2[,] and [wherein one of said second and fourth layers is] are each composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide, and tin-zinc oxide, wherein said second layer has an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers [and the other of said second and fourth is composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, antimony-doped tin oxide, tin-bismuth oxide, and tin-zinc oxide].

36. (Amended) An article comprising:

(a) a temperature-sensitive substrate having a melting point lower than glass; and

(b) an anti-reflection coating comprising a plurality of layers [substantially] transparent to visible light, wherein:

(1) a first layer and a third layer are [substantially] composed of silicon dioxide and

(2) a second layer and a fourth layer have refractive indices between approximately 1.9 and 2.2, and wherein the second and fourth layers are each [substantially] composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide, and the tin-zinc oxide, wherein the second layer has a thickness of between approximately 77.11 and 78.13 nm.

37. (Amended) An article comprising:

(a) a temperature-sensitive substrate having a melting point lower than glass; and

(b) an anti-reflection coating comprising a plurality of layers [substantially] transparent to visible light, wherein:

(1) a first layer and a third layer are [substantially] composed of silicon dioxide; and

(2) a second layer and a fourth layer have refractive indices between approximately 1.9 and 2.2, and wherein the second and fourth layers are each [substantially] composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped indium oxide, tin-bismuth oxide, and tin-zinc oxide, wherein the fourth layer has a thickness of between approximately 18.64 and 22.83 nm.

38. (Amended) A method for providing an anti-reflection coating to a plastic substrate, wherein the coating comprises a first, second, third and fourth layer in consecutive numerical order, each layer being [substantially] transparent to visible light, with the first layer being farthest from the substrate, comprising:

depositing the fourth layer by reactive sputtering, wherein the fourth layer is [substantially] composed of tin-doped indium oxide having an index of refraction between approximately 1.9 and 2.2;

depositing the third layer on the fourth layer by reactive sputtering, wherein the third layer is [substantially] composed of silicon dioxide;

depositing the second layer on the third layer by reactive sputtering at an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers, wherein the second layer is substantially composed of tin-doped indium oxide having an index of refraction between approximately 1.9 and 2.2; and

depositing the first layer on the second layer by reactively sputtering, wherein the first layer is substantially composed of silicon dioxide.

39. (Amended) An anti-reflection coating for a plastic substrate comprising:

(1) a first layer [substantially] composed of silicon dioxide;

(2) a conductive second layer, closer to the substrate than the first layer, [substantially] composed of tin-doped indium oxide having an index of refraction between approximately 1.9 and 2.2 and an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers;

(3) a third layer, closer to the substrate than the second layer, [substantially] composed of silicon dioxide; and

(4) a conductive fourth layer, closer to the substrate than the third layer, [substantially] composed of tin-doped indium oxide having an index of refraction between approximately 1.9 and 2.2,

wherein the first, second, third and fourth layers are [substantially] transparent to visible light.

40. (Amended) A method for providing an anti-reflection coating to a [substantially] plastic substrate, wherein the coating comprises a first, second, third and fourth layer in consecutive numerical order with the first layer being farthest from the substrate, wherein each layer is [substantially] transparent to visible light, comprising:

depositing the first and third layers by reactive sputtering, wherein the first layer is composed of silicon dioxide; and

depositing the second and fourth layers by reactively sputtering, wherein the second and fourth layers have an index of refraction between approximately 1.9 and 2.2, [and wherein one of said second and fourth layers is] are composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide, and tin-zinc oxide and wherein said second layer is applied at an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 460 nanometers [the other of said second and fourth layers is composed of and selected from the group consisting of tin oxide, indium oxide, zinc oxide, antimony-doped tin oxide,tin-bismuth oxide, and tin-zinc oxide].

43. (Amended) An anti-reflection coating for a plastic substrate comprising:

a plastic substrate and a coating wherein said coating includes,

four layers [substantially] transparent to visible light designated the first, second, third and fourth layers in consecutive numerical order beginning with the layer farthest from the substrate, said first and third layers comprised of silicon dioxide and said second and fourth layers having a refractive index higher than said substrate and between 1.9 and 2.2 and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide and tin-zinc oxide; and

said second layer having an optical thickness [no greater than] of about one-quarter to one-third of a wavelength at a wavelength of about 480 to 560 nanometers.

49. (Amended) An anti-reflective coating for a plastic substrate consisting essentially of:

a plurality of high refractive index material layers [substantially] transparent to visible light, having a refractive index between 1.9 and 2.2 and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide; tin-bismuth oxide and tin-zinc oxide and wherein the high refractive index material layer farthest from said substrate has an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers; and

at least one low refractive index material layer having a refractive index material layer lower than each of said plurality of high refractive index material layers wherein one of said at least one low refractive index material layers is disposed between adjacent ones of said plurality of high refractive index material layers.

50. (Amended) An anti-reflection coating for a plastic substrate comprising:

a plurality of high refractive index material layers comprising first and second high refractive index material layers [substantially] transparent to visible light having a refractive index higher than said substrate and between 1.9 and 2.2 and selected from the group consisting of tin oxide, indium oxide, zinc oxide, tin-doped indium oxide, antimony-doped tin oxide, tin-bismuth oxide and tin-zinc oxide; and

at least one low refractive index material layer having a refractive index lower than said substrate wherein [one of said high refractive index material layers is closer to said substrate than said at least one other layer and] said at least one low refractive index material layer [and said at least one other layer are adjacent to one another] is positioned between said first and second high refractive index material layers and the high refracting index material layer farthest from said substrate has an optical thickness of about one-quarter to one-third wavelength at a wavelength from 480 to 560 nanometers.

Add the following new claims 54-62 as follows:

54. (New) The article of claim 1 wherein the low refractive index material farthest from said substrate has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

55. (New) The process of claim 8 wherein the low refractive index material farthest from said substrate is deposited at an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

56. (New) The article of claim 33 wherein said first layer has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

57. (New) The method of claim 38 wherein said first layer has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

58. (New) The coating of claim 39 wherein said first layer has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

59. (New) The method of claim 40 wherein said first layer has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

60. (New) The coating of claim 43 wherein said first layer has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

61. (New) The coating of claim 49 wherein the low refractive index material farthest from said substrate has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.

62. (New) The coating of claim 50 wherein the low refractive index material farthest from said substrate has an optical thickness of about one-quarter wavelength at a wavelength from 480 to 560 nanometers.